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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/064,939	08/30/2002	Robert William Bruce	13DV-13676	3625
30952	7590	10/23/2003	EXAMINER	
HARTMAN AND HARTMAN, P.C. 552 EAST 700 NORTH VAIPARAISO, IN 46383			MCNEIL, JENNIFER C	
			ART UNIT	PAPER NUMBER

1775

DATE MAILED: 10/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Applicati n N .

10/064,939

Applicant(s)

BRUCE ET AL.

Examin r

Jennifer C. McNeil

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-- The MAILING DATE f this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM  
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 24 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-3,6,7,10-19,21,23,24 and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3,6,7,10-19,21,23,24 and 27-31 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 16 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 16 refers to a hafnia-based composition with a stabilizer and further including yttria. This is dependant upon claim 1 which refers to the hafnia-based composition as "consisting essentially" of hafnia and a stabilizer. Is it applicant's intent that the yttria be includes in the composition "consisting essentially" of hafnia and a stabilizer?

### *Claim Rejections - 35 USC § 102*

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by Amano et al (US 4,774,150). Amano teaches a thermal barrier coating comprising zirconia, yttria, and samaria. Regarding claim 17, a bond coat may be present between the substrate and the thermal barrier coating.

Claims 1-3, 6, 17-19, 21, and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Rickerby et al (US 6,025,078). Rickerby teaches a thermal barrier coating comprising zirconia, to which is added yttria and additionally, one of neodymia, dysprosia, gadolinia, erbia, or ytterbia. The yttria is

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added in an amount of 4-20 wt%, and the additional oxide is added in an amount of 4-25 wt%. Each of the ranges claimed by applicant overlap with the above ranges.

Regarding claim 17, a bond coat may be present between the substrate and the thermal barrier coating.

Regarding claim 18, the coating may be applied to a turbine engine blade.

Claims 1, 10, 17, and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Strangman (US 5,512,382). Strangman teaches a thermal barrier coating for a turbine engine component comprising hafnia that may be stabilized with yttria. A bond coat may be provided between the substrate and the coating.

Claims 1, 10, 14, 16-19, and 30 are rejected under 35 U.S.C. 102(e) as being anticipated by Maloney (US 6,284,323). Maloney teaches a thermal barrier coating comprising zirconia, gadolinia, and yttria. Maloney also teaches a coating that may comprise hafnia and gadolinia, or hafnia and yttria (col. 6, lines 15-20).

Regarding claims 14, 16, and 30, the gadolinia may be substituted with yttria, up to 25 mol%.

Regarding claim 17, a bond coat may be present between the substrate and the thermal barrier.

Regarding claim 18, the substrate may be a superalloy.

Claims 1, 2, 6, 19, and 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Rigney et al (US 6,586,115). Rigney teaches a yttria stabilized zirconia coating for a turbine engine component. The coating may also include neodymia in an amount of 5.7-23 wt% (see Table 1). This range is considered to overlap with applicant's range.

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Claims 1, 2, 10, 17, and 18 are rejected under 35 U.S.C. 102(e) as being anticipated by Subramanian (US 6,387,539). Subramanian teaches a thermal barrier coating for a turbine engine component. The coating may comprise hafnia stabilized with dysprosia, gadolinia, samaria, or ytterbia, or the coating may comprise zirconia stabilized with samaria, or erbia. A bond coat may be provided between the substrate and the coating. The substrate may comprise a superalloy.

*Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Amano et al (US 4,774,150). Amano teaches a thermal barrier coating comprising zirconia, yttria, and samaria. Amano teaches the application of the coating to turbine engine components but does not specifically teach an airfoil. Airfoils are exposed to high temperatures and corrosive environments, and as such it would have been obvious to one of ordinary skill in the art at the time of the invention to apply the thermal barrier coating of Amano to a blade of a turbine engine to provide a barrier to the corrosion.

Claims 14, 19, and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strangman (US 5,512,382). Strangman teaches a thermal barrier coating as discussed above, but does not specify the amount of yttria that may be added to stabilize the hafnia. Absent a showing of unexpected results, it

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would have been obvious to one of ordinary skill in the art at the time of the invention to add yttria in an amount sufficient to stabilize the coating.

Claims 1-3, 6, 17-19, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rickerby et al (US 6,025,078). Rickerby teaches a thermal barrier coating comprising zirconia, to which is added yttria, and additionally one of neodymia, dysprosia, gadolinia, erbia, or ytterbia. The yttria is added in an amount of 4-20 wt%, and the additional oxide is added in an amount of 4-25 wt%. Each of the ranges claimed by applicant overlap with the above ranges.

Each of the ranges claimed by applicant overlaps with the above ranges. Furthermore, absent a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the additional oxide in an amount to achieve the desired thermal conductivity or stability of the zirconia, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233).

Claims 12 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maloney (US 6,284,323). Maloney teaches a thermal barrier coating comprising hafnia and gadolinia or yttria, or both. The gadolinia may be added in an amount of 5-60 mol% and the yttria is added in an amount of about up to 25 mol%. These ranges are considered overlapping with applicant's ranges. Each of the ranges claimed by applicant overlaps with the above ranges. Furthermore, absent a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the additional oxide in an amount to achieve the desired thermal conductivity or stability of the hafnia, since it has been held that where the general conditions of a claim are disclosed in the prior art,

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discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233).

Claims 3, 6, 7, 11, 12, 13, 15, 19, 21, 24, 27, 28, 29, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Subramanian (US 6,387,539). Subramanian teaches a thermal barrier coating as discussed above, but does not give specific ranges for all of the possible additives. Subramanian does give an example of samaria combined with zirconia, wherein the samaria is present at 3 mol%. Furthermore, absent a showing of unexpected results, it would have been obvious to one of ordinary skill in the art at the time of the invention to add the additional oxide in an amount to achieve the desired thermal conductivity or stability of the zirconia or hafnia, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art (*In re Aller*, 105 USPQ 233).

### *Response to Arguments*

Applicant's amendments have overcome the rejections of Stecura (US 4,535,033), Schulz (US 6,127,006), and Alperine (US 6,333,118).

Applicant's arguments regarding Amano, Rickerby, and Maloney suggest that the inclusion of yttria in the compositions does not constitute "consisting essentially". The inclusion of yttria in the coatings is not considered to alter the performance of the coatings. This is true of applicant's invention as well (see claim 16, and applicant's instant specification). The transitional phrase "consisting essentially of" limits the scope of a claim to the specified materials or steps "and those that do not materially affect the basic and novel characteristic(s)" of the claimed invention. Applicant has made no argument that the inclusion of yttria affects the basis and novel characteristics of the claimed invention.

Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new ground(s) of rejection.

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*Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jennifer C. McNeil whose telephone number is (703) 305-0553. The examiner can normally be reached on 9-6, M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-0611.



JCM  
October 19, 2003

Jennifer C. McNeil  
Examiner  
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